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ABSTRACT

Educators and computer scientists have the obligation to humanize students' images of the computer. This can be achieved if students can be brought to realize that computers can be viewed as extensions of the human brain, making possible otherwise inconceivable human advances. Students should be shown that these machines can perform functions similar to those of man's mind, such as mathematical calculations, following instructions, remembering, reasoning deductively, comparing, observing, choosing among alternatives and conducting data analyses and simulations. In addition, students should be made aware of the practical applications of computers in education, environmental studies, science, industry, commerce, government and social policy-making. Having gained these insights and acquired access to the computer, scientists will recognize that computers can help man to retain his humanity and identity in an increasingly complex and crowded world. (PB)

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THE HUMANIZING EDUCATIONAL MONSTER:

EXPLAINING "THEM" TO THE SCHOOLS

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You and I are involved in a computer world every day. We attend meetings such as AEDS, we read the related periodicals, we hear, we see, we use, we talk computers, but what about the student? What image flashes through his mind when he hears the word "computer"? Does he picture a cold, aseptic machine made of metal and chrome, spewing out inaccurate bills and credit information in solitary and self-contained austerity? If so, let's see what we can do to change this image--to humanize the computer--to picture the computer as an extension of the human brain which makes possible social advances that would be otherwise impossible and which is a vital, living part of our everyday life.

Does the student think of a computer as a machine that merely adds, subtracts, multiplies, and divides? Let's see what capabilities the computer possesses that will "humanize" it further. The numerical calculations it can carry out range in difficulty and complexity from simple counting to solving differential equations. It can receive and follow instructions. It has a memory in which it stores information for future use. Because it is equipped with and, or, and not components, it can reason deductively. Also, it can make comparisons and, on the basis of observation, choose among alternative courses of action. It can analyze raw data containing evidence of cycles, repetitions, and other patterns and may confirm current hypotheses or lead to new ones. A general purpose computer can simulate stars and floods and traffic conditions.

Do we show the student what other students are doing? Some examples might be, that right now, students in Massachusetts are using the computer in conjunction with Forrester's "World Dynamics Model" to simulate the effects of growth on the world's environment. In Florida, students are learning with the help of the computer how changes in sunlight, in water runoff, in animal population affect the food chain in a fresh water lake. Aggie students in Texas are determining how many cattle can be grazed efficiently on the south 40. In California, students are playing computer "games" with a four million dollar City Model developed by the federal government. And they are learning how their decisions as government officials, businessmen and voters. . . on questions of employment, transportation, schools, construction. . . all interact to affect the quality of life in the various parts of the city.

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Surely the average student should recognize many accomplishments of the computer in the business world. In many offices and factories computers maintain inventories of supplies. Computers calculate payrolls. Oil refineries may be operated and controlled entirely by computers. Most airlines have central computers for storing information on the availability of seats on all flights--the clerk pushes a button on a switch device to communicate with the computer and an answer comes back in seconds. Here we can point out a case where "computers talk to computers"--this may have a humorous ring, but that is what takes place when a request for airline reservations covers connecting flights on two or more carriers. And who is not aware of the use of computers in the banking business today--we all carry our personal checks imprinted in magnetic ink for computers to process.

But the computer is being used in so many diverse areas that the student may not be cognizant of--and of which we should make him aware--perhaps beginning in the academic field itself. We are all familiar with the uses in which a computer can be employed as a teaching aid, but does the student know that computers can take care of his registration, help him select his courses, "teach" him his lessons, keep track of his grades and records, and serve as a tool for counseling? Even now a computer may be helping his football team analyze plays. And he may even call upon a computer service to find him a "date" if he is too shy to do this himself.

In the registration and scheduling area there have been cases where students who feel completely left out and have had extremely poor luck in scheduling struck against computerized registration and paraded around with signs saying, "Do not fold, mutilate, or spindle." On the other hand, there are programs such as the one at Purdue where a very high percentage of the time a student gets the classes he wants when he wants them--and 70% of the time even gets the professor he wants, too. This latter program gives the student a feeling of being considered as an individual, not just a social security number.

We must highlight the use of computers in solving everyday problems, such as those connected with the environment, as the subject of ecology moves steadily to the forefront. A computer has been used to analyze causes of fire in a definite area so that preventive action can be taken. Species of natural life have been classified by computers. Computers are helping investigators in weather research and are providing basic information on which improved weather predictions depend. Computers can simulate flood conditions and also the countermeasures that will save lives and property.

Another problem whose solution calls for computer type models is that of air traffic control. Computers are assigning aircraft to particular routes for airlines. Computers are helping engineers, pilots, airline executives, and government authorities put to the test their ideas on what might be done to speed up present day air service and allow for future expansion.

In the field of medicine the usefulness of the computer is particularly well illustrated. Medical investigators have built a computer equipped with a scanning device that can examine a cell sample in less than a

two-hundredth of a second. Computers are used to isolate brain signals. Computers are used to simplify the time-consuming job of diagnosing thyroid disease and as an aid in diagnosis for pelvic surgery.

Another example of individualization in our complex society is in the automobile industry, where at one time a man by the name of Henry Ford stated, "You can order any color Ford you want so long as it is black." Now an individual can order from hundreds of combinations of colors and accessories, thanks to a computer which makes sure that proper items are on the assembly line at the right time and in the right place. This does individualize the car even though it was produced as one of thousands.

At one of our large oil companies, a programmer took a step toward humanizing the bills sent out to credit card customers. He programmed the computer to respond with a "thank you" when a customer purchased something other than gas or oil and with hopes that the customer would be well satisfied with his purchase. The surprising result was that the company received a large number of letters from customers complimenting the company for the personal interest taken in their accounts!

To digress from the serious, let's look at the comical possibilities of the computer. A printout of Snoopy might seem to be laughable, but, if it serves no other purpose, it does put the machine into perspective and it brings out the light side of its capabilities.

An area that needs constant attention is--making it more convenient for the students of any discipline to use the computer. Let's not insist he become an accomplished programmer, but give him the means to understand the problem and get the answers he needs. Let us emphasize how to apply and manage the computer.

One humanizing factor on the input side is the fact that cards can now be marked by hand by a simple encoding device--and that this hand marking can be done at any time, at any place, without the necessity of an interposing keypunch machine. And it is possible that some day the student may be able to talk to the computer, to tell it necessary information--or even to hold a conversation with it.

Some undesirable human traits have been attributed to computers by the news media--that they are temperamental, paranoiac, and subject to making wry and humorous mistakes--mistakes which may infuriate the person concerned and delight the public but which are almost invariably the result of human error in preparation of input rather than error on the part of the computer.

We must not lead the student to expect too much of a machine by over-endowing it with human attributes. The day will never come, as Corey Ford facetiously suggests, when the computer will seize control of man's business to the extent that the machine will go out to play golf, leaving man to handle endless reports. Nor must we create the impression of an approaching Armageddon when an infernal "thinking" machine takes control of the earth.

What is becoming more and more evident is that only the computer can enable us to retain some degree of individuality and identity in the midst of a crushing mass of anonymous humanity in an overpopulated and overcrowded world.